# THE ASTROPHYSICAL JOURNAL CONTENTS OF VOLUME 302, PART 1

# 1986 MARCH 1, Number 1

MODELS OF EXTENDED RELATIVISTIC ENVELOPES OF NEUTRON STARS Bohdan Paczyński and Nels Anderson	Page 1	Fiche 28-A7
A CRITICAL EXAMINATION OF THICK DISKS WITH EQUATORIAL ACCRETION J. H. Hunter, Jr., and R. E. Wilson	11	28-B3
GRAVITATIONAL COLLAPSE AND THE COSMIC ANTINEUTRINO BACKGROUND S. E. Woosley, James R. Wilson, and Ron Mayle	19	28-B11
DESTRUCTION OF <sup>3</sup> He IN STARS	35	28-C13
CAUSALITY CONSTRAINTS ON COSMOLOGICAL PERTURBATIONS	39	28-D3
ON THE DISTANCE MEASURE FOR GRAVITATIONAL LENSES	43	28-D7
HIGH-RESOLUTION RADIO OBSERVATIONS OF THE MOST LUMINOUS QUASAR  Helmut Kühr, John T. Stocke, Peter A. Strittmatter, Norbert Bartel, Andreas Eckart,  Cornelius Schalinski, Arno Witzel, and Peter Biermann	52	28-E5
RELATIVISTIC BEAMING AND QUASAR EMISSION LINES Beverley J. Wills and I. W. A. Browne	56	28-E9
THE EMISSION-LINE REGIONS IN BROAD ABSORPTION LINE QUASARS	64	28-F3
THE INTERACTION OF INTERSTELLAR CLOUDS WITH A "QUASAR WIND" AND ITS RELATION TO THE NARROW EMISSION LINE REGIONS OF SEYFERT GALAXIES	81	28-G10
NARROW EMISSION LINE PROFILES IN A "QUASAR WIND"	95	29-A10
ASTROPHYSICAL MASERS WITH MAGNETIC FIELDS AND VELOCITY GRADIENTS Shuji Deguchi, William D. Watson, and Lonny R. Western	108	29-B10
WAVE PROPAGATION IN PULSAR MAGNETOSPHERES: DISPERSION RELATIONS AND NORMAL MODES OF PLASMAS IN SUPERSTRONG MAGNETIC FIELDS	120	29-C8
WAVE PROPAGATION IN PULSAR MAGNETOSPHERES: REFRACTION OF RAYS IN THE OPEN FLUX ZONE  John J. Barnard and Jonathan Arons	138	29-D12
STEADY HYDROMAGNETIC FLOWS IN OPEN MAGNETIC FIELDS. I. A CLASS OF ANALYTIC SOLUTIONS  B. C. Low and K. Tsinganos	163	29-F9
ON THE KELVIN-HELMHOLTZ INSTABILITIES OF HIGH-VELOCITY MAGNETIZED SHEAR LAYERS S. Roy Choudhury and R. V. E. Lovelace	188	30-A6
OSCILLATOR STRENGTHS FOR ALLOWED AND INTERCOMBINATION ELECTRIC DIPOLE TRANSITIONS IN Fe xii	200	30-B4
LOW-ENERGY ELECTRON-ATOM BREMSSTRAHLUNG	205	30-B9
INTERNAL KINEMATICS OF SPIRAL GALAXIES: GAS AND STELLAR ROTATION CURVES AND DISPERSION PROFILES	208	30-B12
THE DYNAMICS OF THE ACTIVE GALAXY NGC 1052	234	30-D10
ANOMALOUS REDSHIFT COMPANION GALAXIES: NGC 7603	245	30-E12
ULTRAVIOLET-EXCESS OBJECTS IN THE FIELD OF NGC 6121 (M4)	257	30-G9
EXTENT OF IONIZED CALCIUM IN THE OUTER PARTS OF GALAXIES  Donald C. Morton, Donald G. York, and Edward B. Jenkins	272	31-A1
FAR-INFRARED STRUCTURE IN THE NUCLEAR REGION OF M51	280	31-B7

THE X-RAY SPECTRUM OF THE COMA CLUSTER OF GALAXIES	Page 287	Fiche 31-B14
THE JET OF PKS 0521 – 36: AN AGING COUNTERPART OF M87?	296	31-C9
THE RADIO GALAXY IC 4296 (PKS 1333-33). I. MULTIFREQUENCY VERY LARGE ARRAY OBSERVATIONS  N. E. B. Killeen, G. V. Bicknell, and R. D. Ekers	306	31-D11
H0323+022: A NEW BL LACERTAE OBJECT WITH EXTREMELY RAPID VARIABILITY  E. D. Feigelson, H. Bradt, J. McClintock, R. Remillard, C. M. Urry, S. Tapia, B. Geldzahler,  K. Johnston, W. Romanishin, P. A. Wehinger, S. Wyckoff, G. Madejski,  D. A. Schwartz, J. Thorstensen, and B. E. Schaefer	337	32-A3
OBJECTS ASSOCIATED WITH LOW-MASS STAR FORMATION IN THE GUM NEBULA	352	32-B4
TEMPERATURE FLUCTUATIONS AND INFRARED EMISSION FROM DUST PARTICLES IN A HOT GASEli Dwek	363	32-C3
MEASUREMENTS OF X-RAY SCATTERING FROM INTERSTELLAR GRAINS		
Christopher W. Mauche and Paul Gorenstein	371	32-C11
EVIDENCE FOR A BIPOLAR WIND IN THE CATACLYSMIC VARIABLE PG 1012-029  R. K. Honeycutt, E. M. Schlegel, and R. H. Kaitchuck	388	32-D14
RIGEL'S CIRCUMSTELLAR ENVELOPE STRUCTURE	403	32-F3
STELLAR TECHNETIUM AND NIOBIUM ABUNDANCES AS A MEASURE OF THE LIFETIME OF AGB STARS IN THE THIRD DREDGE-UP PHASE	410	32-F10
CARBON ABUNDANCES IN HALO DWARFSJocelyn Tomkin, Christopher Sneden, and David L. Lambert	415	32-G1
COLORS OF REFLECTION NEBULAE. III. ULTRAVIOLET SCATTERING BY SMALL PARTICLES IN REFLECTION NEBULAE ASSOCIATED WITH 17, 20, AND 23 TAURI		
Adolf N. Witt, Ralph C. Bohlin, and Theodore P. Stecher	421	32-G7
THE STRUCTURE OF GALACTIC H 1 IN DIRECTIONS OF LOW TOTAL COLUMN DENSITY Felix J. Lockman, Keith Jahoda, and Dan McCammon	432	33-A4
A THEORETICAL STEADY STATE MODEL FOR THE DISTRIBUTION OF GAS AND MAGNETIC FIELD IN M31 AND IN OUR GALAXY	450	33-B8
CURRENT STATUS OF THE GALACTIC CENTER POSITRON-ANNIHILATION SOURCE M. Leventhal, C. L. MacCallium, A. F. Huters, and P. D. Stang	459	33-C3
ON THE NUMBER OF COMETS AROUND OTHER SINGLE STARS Charles Alcock, Carl C. Fristrom, and Russell Siegelman	462	33-C6
CO* FLUORESCENCE IN COMETS	477	33-D9
THEORETICAL STUDY OF CS-CONTAINING MOLECULES. I. AB INITIO HARTREE-FOCK PREDICTIONS FOR C <sub>2</sub> S <sub>2</sub>	488	33-E7
VISUAL ABSORPTION LINES IN DARK CLOUDS: HIGHLY REDDENED STARS NEAR THE CENTER OF THE OPHIUCHUS MOLECULAR CLOUD	492	33-E11
SOLAR FILAMENT ERUPTIONS AND ENERGETIC PARTICLE EVENTS S. W. Kahler, E. W. Cliver, H. V. Cane, R. E. McGuire, R. G. Stone, and N. R. Sheeley, Jr.	504	33-F9
INTERPLANETARY COSMIC-RAY RADIAL AND LATITUDINAL GRADIENTS DERIVED IN 1984 USING IMP 8, VOYAGER, AND PIONEER DATA	511	33-G8
ERRATUM S Andromedae 1885: A Centennial Review	517	33-G14
INSTRUCTIONS TO AUTHORS	i	34-A1
1986 MARCH 15, Number 2		
MODELS OF RADIATION-DRIVEN WINDS FROM GENERAL RELATIVISTIC NEUTRON STARS  Bohdan Paczyński and M. Prószyński	519	36-C1
EVOLUTIONARY PERIOD CHANGES IN VARIABLE HELIUM-RICH WHITE DWARFS Steven D. Kawaler, D. E. Winget, Icka Iben, Jr., and C. J. Hansen	530	36-C12

#### CONTENTS

	Page	Fiche
A DISTANCE SCALE FROM THE INFRARED MAGNITUDE/H 1 VELOCITY-WIDTH RELATION. V. DISTANCE MODULI TO 10 GALAXY CLUSTERS, AND POSITIVE DETECTION OF BULK SUPERCLUSTER MOTION TOWARD THE MICROWAVE ANISOTROPY M. Aaronson, G. Bothun, J. Mould, J. Huchra, R. A. Schommer, and M. E. Cornell	536	36-D4
SYSTEMATICS OF BULGE-TO-DISK RATIOS	564	36-F1
THE Hα VELOCITY WIDTHS OF GIANT H 11 REGIONS AS DISTANCE INDICATORS		
Jean-René Roy and Robin Arsenault	579	37-A1
MOLECULAR PROCESSES AND GRAVITATIONAL COLLAPSE IN INTERGALACTIC SHOCKS  Mordecai-Mark Mac Low and J. Michael Shull	585	37-A7
PRIMORDIAL STELLAR EVOLUTION: THE PROTOSTAR PHASE Steven W. Stahler, Francesco Palla, and E. E. Salpeter	590	37-A1
EXOSAT AND EINSTEIN X-RAY OBSERVATIONS OF THE SNR 1E 1149.4-6209 IN CRUX: A UNIFIED PICTURE? G. F. Bignami, P. A. Caraveo, A. Goldwurm, S. Mereghetti, and G. G. C. Palumbo	606	37-C2
COLLISIONLESS BOLTZMANN SIMULATION OF STELLAR DISKS HAVING A SMALL BULGE Mitsugu T. Nishida	611	37-C1
SOLUTIONS FOR THE MODIFIED NEWTONIAN DYNAMICS FIELD EQUATION	617	37-D2
ABSOLUTE MAGNITUDES AND KINEMATIC PROPERTIES OF RR LYRAE STARS Suzanne L. Hawley, William H. Jefferys, Thomas G. Barnes III, and Wan Lai	626	37-D1
VERY EXTENDED INFRARED EMISSION AT THE CENTER OF M51: THE ROLE OF STAR FORMATION  C. M. Telesco, R. Decher, and Ian Gatley	632	37-E3
RADIO OBSERVATIONS OF STARBURST GALAXIES	640	37-E1
THE LITHIUM ABUNDANCE GAP IN THE HYADES F STARS: THE SIGNATURE OF DIFFUSIONGeorges Michaud	650	37-F9
THE GIANT BRANCH OF THE OPEN CLUSTER NGC 2539	656	37-G1
THE DUST SHELLS OF NML CYGNUS AND IRC 10420: INNER RADIUS, TEMPERATURE, AND OPTICAL THICKNESSStephen T. Ridgway, Richard R. Joyce, Dennis Connors, Judith L. Pipher, and Christopher Dainty	662	37-G8
TWO SUPERGIANTS IN THE LARGE MAGELLANIC CLOUD WITH THICK DUST SHELLS  J. H. Elias, Jay A. Frogel, and P. B. W. Schwering	675	38-A8
DISTRIBUTIONS OF $^{13}$ CO EMISSION IN THE DISKS OF LATE-TYPE SPIRAL GALAXIES Judith~S.~Young~and~D.~B.~Sanders	680	38-B1
COMPARISON OF 2.1 AND 3.8 MICRON LINE PROFILES OF SHOCKED $H_2$ IN THE ORION MOLECULAR CLOUD	693	38-C1
SUBMILLIMETER WAVELENGTH MOLECULAR SPECTROSCOPY OF THE ORION MOLECULAR CLOUD Glenn J. White, L. W. Avery, K. J. Richardson, and J. C. G. Lesurf	701	38-C
1E 1415.6+2557: AN X-RAY-SELECTED BL LACERTAE OBJECT IN A LUMINOUS GALAXY J. P. Halpern, C. D. Impey, G. D. Bothun, S. Tapia, E. D. Skillman, A. S. Wilson, and E. J. A. Meurs	711	38-D
X-RAY OBSERVATIONS OF SUPERNOVA REMNANTS RESEMBLING THE CRAB NEBULA	718	38-D
HALOS AROUND PLANETARY NEBULAE	727	38-E
THE INFRARED EMISSION BANDS. I. CORRELATION STUDIES AND THE DEPENDENCE ON C/O RATIO  Martin Cohen, Lou Allamandola, A. G. G. M. Tielens, Jesse Bregman, J. P. Simpson,  Fred C. Witteborn, Diane Wooden, and Dave Rank	737	38-F
ASTROPHYSICAL WATER MASERS IN THE PRESENCE OF MAGNETIC FIELDS Shuji Deguchi and William D. Watson	750	38-G
A PRESCRIPTION FOR PERIOD ANALYSIS OF UNEVENLY SAMPLED TIME SERIES		
James H. Horne and Sallie L. Baliunas	757	39-A
APPLICATION OF THE FOURIER TRANSFORM FOR SOLVING AND IMPROVING SPECTROSCOPIC BINARY STAR ORBITS	764	39-A
ULTRAVIOLET SURVEY FOR HOT COMPANIONS AMONG NONVARIABLE YELLOW SUPERGIANTS  A. Arellano Ferro and Barry F. Madore	767	39-B
THE MAGNETIC FIELD OF THE BY DRACONIS FLARE STAR EQ VIRGINIS	777	39-R

#### CONTENTS

	Page	Fiche
NUMERICAL SOLUTION OF THE MAGNETOSTATIC EQUATIONS FOR THICK FLUX TUBES, WITH APPLICATION TO SUNSPOTS, PORES, AND RELATED STRUCTURES $V.J.$ Pizzo $V.J.$ Pizzo	785	39-C6
THE DYNAMICS OF MAGNETICALLY TRAPPED FLUIDS. I. IMPLICATIONS FOR UMBRAL DOTS AND PENUMBRAL GRAINS	809	39-E2
THE INFLUENCE OF FACULAE ON TOTAL SOLAR IRRADIANCE AND LUMINOSITY	826	39-F5
HEAT TRANSPORT IN STEEP TEMPERATURE GRADIENTS. I. SMALL FLARING SOLAR LOOPSDean F. Smith	836	39-G
EFFECTS OF THE INTERACTION BETWEEN PLASMA AND NEUTRALS ON THE STABILITY OF THE COMETARY IONOPAUSE	849	40-A
ABSTRACTS OF ASTROPHYSICAL JOURNAL SUPPLEMENT SERIES, 1986 APRIL ISSUE		
CCD PHOTOMETRY OF LARGE MAGELLANIC CLOUD CLUSTERS. II. THE INTERMEDIATE-AGE CLUSTER H4  Mario Mateo and Paul Hodge	853	40-A
WIDE BINARIES IN THE DIRECTION OF ANDROMEDAJohn N. Bahcall, Burton F. Jones, and Kavan U. Ratnatunga	853	40-A
FIRST ORBITS FOR THE VISUAL DOUBLE STARS ADS 328, ADS 9043, AND ADS 13048	853	40-A
INDEX TO VOLUME 302 PARTS LAND 2	i	36-B

# THE ASTROPHYSICAL JOURNAL LETTERS TO THE EDITOR

## **CONTENTS OF VOLUME 302, PART 2**

## 1986 March 1, Number 1

	Page	Fiche
A SLICE OF THE UNIVERSE	L1	8-A4
REMARKABLE EMISSION-LINE PROFILES IN THE SEYFERT GALAXY ESO $263-G13$ (= F427)  A. S. Wilson and J. A. Baldwin	L7	8-A7
H0538+608: A BRIGHT AM HERCULIS-TYPE X-RAY SOURCE R. A. Remillard, H. V. Bradt, J. E. McClintock, J. Patterson, W. Roberts, D. A. Schwartz, and S. Tapia	L11	8-A13
NARROW-BAND, SLOWLY VARYING DECIMETRIC RADIATION FROM THE DWARF M FLARE STAR YZ CANIS MINORIS	L17	8-B5
NEW OH OBSERVATIONS OF THE SUPERGIANT IRC + 10420 B. M. Lewis, Yervant Terzian, and J. Eder	L23	8-B10
ANGULAR EXPANSION MEASUREMENT WITH THE VLA: THE DISTANCE TO NGC 7027	L27	8-B14
HCNH <sup>+</sup> : A NEW INTERSTELLAR MOLECULAR ION	L31	8-C4
1986 March 15, Number 2		
VOIDS IN THE CENTER FOR ASTROPHYSICS CATALOG	L37	40-D
THE DIFFERENCE BETWEEN THE GALAXY AND CLUSTER CORRELATION FUNCTIONS:  A MANIFESTATION OF TAILS OF GALAXY CLUSTERS	L41	40-D
HIGH-PRECISION RADIAL VELOCITIES FOR FAINT GIANTS: RADIAL VELOCITIES OF EXTREME HALO SYSTEMS AND THE MASS OF THE GALAXY	L45	40-D
LITHIUM IN THE HYADES CLUSTER	L49	40-D
THE EXCITING STAR OF HH 57	L55	40-E4
SN 1985f: DEATH OF A WOLF-RAYET STAR Mitchell C. Begelman and Craig L. Sarazin	L59	40-E
IRAS SOURCES ASSOCIATED WITH SHOCKED GAS REGIONS IN IC 443 YL. Huang, R. L. Dickman, and Ronald L. Snell	L63	40-E
A SHOCK CONDENSATION MECHANISM FOR LOOP PROMINENCES T. G. Forbes and J. M. Malherbe	L67	40-F
SOLAR IRRADIANCE VARIATIONS DERIVED FROM MAGNETOGRAMS G. A. Chapman and J. E. Boyden	L71	40-F